Florian Amann

Curriculum Vitae

September, 2013

Senior Research Scientist (Oberassistent)
Swiss Federal Institute of Technology (ETH), Zürich
Department of Earth Science, Engineering Geology
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Born May 26,1975, Regensburg, Germany

Current Position and Responsibilities

- Senior Research Scientist, ETH Zürich, Department of Earth Science, Engineering Geology
    - Experimental rock mechanics and analyses of the hydro-mechanical coupled behavior of clay rocks, coupled hydro-mechanical numerical analyses (2008 – present)
    - Expert board of the *Swiss Federal Nuclear Safety Inspectorate* (ENSI), Rock mechanics and hydro-mechanical coupled numerical modeling in the framework of the selection procedure for nuclear waste disposals (2008 – present)
    - Expert board of the *Rio Tinto Center for Underground Mine Construction*, Research on rock mass characterization, mechanized excavation, and rock and rock mass behaviour at great depth (2012 – present)
    - Teaching: 1 course per year ("*Rock Mechanics and Rock Engineering*")

Education

- Ph.D. Engineering Geology, Friedrich-Alexander University, Erlangen-Nürnberg, Germany, 2006
- M.Sc. Geology (Applied Geology), Friedrich-Alexander University, Erlangen-Nürnberg, Germany, 2002

Research Experience

Senior Research Scientist, ETH Zürich, Engineering Geology (2008 – present)

- Hydro-mechanical behavior of clay rocks on the laboratory and nuclear waste repository scale in the short- and long-term
- Analyses of failure mechanism of various rock types (sedimentary, igneous and metamorphic) under compression based on micro-seismic, micro-structural and mineralogical analyses

- Rock water characteristic curves of clay rock and influence of total suction on rock strength and behaviour
- Mechanized excavation methods for tunnelling and mining (utilization and penetration)
- Geomechanical response of landslides

Rio Tinto Center for Underground Mine Construction (2012 - present)

- Failure behaviour of veined crystalline rocks and prediction of strain burst phenomena
- Development of best-practice guidelines for rock mass characterization from borehole logging, rock mechanical laboratory testing and mine-by experiments
- Development of prediction models for the performance of newly developed Tunnel Boring Systems (step-change technology) based on mine-by experiments (trials), rock mass characteristics relevant for the scale of investigation and rock mass behaviour

Graduate student research, Friedrich – Alexander University Erlangen-Nürnberg, Germany and Pöyry Infra Ltd., Switzerland (2002 - 2005)

- Monitoring of landslides and analyses of underpinning processes
- Numerical analyses of deep seated rock slope instabilities
- Rock avalanche analyses and run-out prediction
- Analyses of yielding support measures for tunnelling in squeezing ground
- Implementation of yielding support strategies for tunnels in numerical codes

Undergraduate student research, Friedrich – Alexander University Erlangen-Nürnberg, Germany (1998-2002)

- Analyses and monitoring of several landslides
- Soil and water chemistry in areas of different land use

Professional Key Experience and Expert work

Marti Tunnelling Ltd, Bern, Switzerland (2008 – present): Rock Mechanical Expert

- Pump-Storage hydropower scheme “Linth Limmern”: Analyses, prediction and mitigation measures for strain burst phenomenon: 2008 – present
- Pump-Storage hydropower scheme “Nant de Drance”: TBM data interpretation in relation to rock mass characteristics, rock strength characteristics (anisotropy, peak strength, onset of dilatancy), and rock mass behaviour (spalling): 2010 - present

Pöyry Energy Ltd, Zürich, Switzerland (2005 - 2007): Senior Engineer

- “Nant De Drance” Pump-Storage hydropower scheme (Switzerland): Responsible for engineering geological and rock mechanical site and laboratory investigations. Design of the pressure tunnel system, access tunnel and underground power house. Analyses of potential subsidence problems as a

consequence of effective stress changes around tunnels and associated safety issues for the existing double-arc concrete dam: 2005 - 2007

- "Nam Ngum II" hydropower scheme (Laos): Responsible for engineering geological and rock mechanical site investigations. Foundation analyses for the 185 m high concrete face rock fill dam (e.g. plinth design). Design of the pressure tunnel system: 2005 - 2007
- "Santa Rita" run-off river hydropower scheme (Peru): responsible for engineering geological, soil mechanical and rock mechanical site and laboratory investigations. Design of the pressure tunnel system, underground power house and weir for the basic and tender design project: 2006 – 2007

Electrowatt Infra Ltd., Zürich, Switzerland (2002 - 2005): Project Engineer

- "Gotthard Base Tunnel" (Switzerland): Rock mechanical analyses and numerical simulation of ground behaviour and support measures in weak cataclastic rocks at great depth (squeezing): 2002 – 2005
- "Bypass Zürich" (Switzerland): Design and numerical analyses of ground and support behaviour in difficult ground at low overburden: 2003 - 2005
- Tunnel "Luzerner Ring" Basel (Switzerland): Geotechnical analyses of large excavation diameters in soil in an urban environment at low overburden: 2003 - 2005
- Constructability and design of the potential nuclear waste repository "Benken" (Switzerland): Coupled hydro-mechanical analyses of nuclear waste repositories: 2004 - 2005

Supervision Experience

Ph.D. students

- *Katrin Wild (**Ph.D** ETH Zürich; 2012 - present)*: "Experimental study of the short- and long-term hydro-mechanical behaviour of Oplainus Clay - development of a constitutive model for clay rocks"
- *Reto Thöny (**Ph.D** ETH Zürich; 2008 - present):* "The influence of multi-scale pre-existing discontinuities on spatial and temporal deformation around a mine-by experiment in Opalinus clay at the Mont Terri Underground research laboratory (Switzerland)"
- *Helmut Wannenmacher (**Ph.D** University of Innsbruck, Austria; 2008 - present):*"Development of a revised penetration prediction model for Tunnel Boring Systems based on empirical data"
- *Jürgen Hansmann (**Ph.D** ETH Zürich; 2008 - 2012):* " Analysis of transient surface deformations above the Gotthard Base Tunnel (Switzerland)"
- *Valentin Gischig (**Ph.D** ETH Zürich; 2008 - 2011):* "Kinematics and failure mechanism of the Randa rock slope instability (Switzerland)"
  - ➢ 2011 AGU Natural Hazards Focus Group Award for Graduate Research

Graduate / Undergraduate students

- *Linda Wymann (**M.Sc.** ETH Zürich; 2012 - present):* "The influence on total suction on the unconfined compressive strength of Opalinus Clay"
- *Mark Hoffmann (**M.Sc.** ETH Zürich; 2012 - present):* "Engineering geological assessment of the Kilchenstock landslide, Glarus, Switzerland"
- *Nicolas Kupferschmied (**M.Sc.** ETH Zürich; 2012 - present):* "Fracture development around boreholes in Opalinus Clay in the short- and long-term"

- *Sophie Gschwind (**M.Sc.** ETH Zürich; 2012 - present):* "The influence of micro-structure, heterogeneities and mineralogical composition on the strength and failure behaviour of Opalinus Clay (sandy facies)"
- *Katrin Wild (**M.Sc.** ETH Zürich; 2012 - present):* "The influence of rock mass characteristics on TBM penetration – a case study in the Nant de Drance access tunnel, Wallis, Switzerland"
- *Orlando Lanfranchi (**M.Sc.** ETH Zürich; 2012):* "Geological and geotechnical assessment of the Kärpf rock slope instability, Glarus, Switzerland"
- *Lukas Hamann (**M.Sc.** ETH Zürich; 2011):* "Geological-geotechnical analysis of the Vicosoprano rock fall events, Grison, Switzerland"
- *Dominique Statdlin (**M.Sc.** ETH Zürich;* 2009): "The influence of structural heterogeneities in Quintner Limestone on the behaviour around tunnels"
- *Christian Haug (**M.Sc.** ETH Zürich*; 2008): "Shear strength of pre-existing discontinuities in Opalinus Clay"
- Ivo Schwenk *(**M.Sc.** ETH Zürich*; 2008): "Relationship between brittle failure and swelling in sulfate bearing clay rocks"
- *Sebastian Zimmer (**B.Sc.** ETH Zürich; 2012):* "The influence of total suction on the tensile strength of Opalinus Clay"
- *Katrin Wild (**B.Sc.** ETH Zürich; 2011):* "The influence of water content on the tensile strength of Opalinus Clay"
- *Mark Simoni (**B.Sc.** ETH Zürich; 2010):* "Inventory of rock slope instabilities in the potential permafrost environment between Kärpf and Muttsee, Glarus, Switzerland"
- *Lukas Flückiger (**B.Sc.** ETH Zürich; 2009):* "Engineering geological assessment of the Saasberg rock slope instability, Glarus, Switzerland"

Supporting supervision or thesis committee member

Ph.D. students

- *Rob Bewik* (***Ph.D** University of Toronto; 2011 - current):* "Fracture formation in brittle rock types under shear loading conditions"
- *Martin Ziegler (**Ph.D** ETH Zürich; 2010 - current):* "Development of exfoliation fractures in the Central Swiss Alps (Grimsel area, Aar Massif)"
- *Kerry Leith (**Ph.D** ETH Zürich; 2008 - 2012):* "An integrated framework for assessing rock slope sensitivity in the Matter and Saas valley, Switzerland"

Graduate / Undergraduate students

- *Michael Hunziker (**M.Sc** ETH Zürich; 2011):* "Earth-quake induced rock slope failure"
- *Sarah Nussbaumer (**M.Sc** ETH Zürich; 2011):* "Seasonal effects on rock slope instabilities – case of the Moosflue-Sparrhorn rock instability, Aletsch Glacier, Switzerland"
- *Andreas Ludwig (**M.Sc** ETH Zürich; 2011):* "Kinematic analysis of a complex rockslide - the example of Brienz, Graubünden, Switzerland"
- *Gerd Rothard (**M.Sc** ETH Zürich; 2010):* "The rock slope instability at the Freiberg Kärpf"

- *Perola Andreas Persson (**M.Sc** ETH Zürich; 2009*): "Development of deep-seated slope instabilities in response to active glacier retreat: Aletschglacier, Oberwallis, Switzerland"
- *Sonderegger Michael (**M.Sc** ETH Zürich; 2009):* "Evaluation of methods to estimate in-situ stresses in the area of the planned pump-storage hydropower scheme Emosson, Switzerland"
- *David Fossati (**M.Sc** ETH Zürich; 2007):* "Analyses of a deep seated landslide in the Calancha Valley, Switzerland"

Teaching Experience

Lecturer at ETH Zürich, Department of Earth Science, Engineering Geology:

- Rock Mechanics and Rock Engineering (M.Sc. level; 2007-present); primary teaching responsibility
- Introduction to Engineering Geology (B.Sc. level, 2009-present)
- Average teaching effectiveness score: 4.6 / 5.0 (details available)
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Honors

Professorship offered at the University of Wisconsin in Madison for rock mechanics related to underground excavation, conventional and unconventional oil and gas reservoirs, and CO_2 sequestration, 2013, declined

Funded Research and Equipment Grants

- Swiss Nuclear Safety Inspectorate, 2012 – 2016 (role: PI) – **Awarded sum ~ $580'000**

  Topic: Experimental study of poro-elastic properties and hydro-mechanical behaviour of Opalinus Clay, and development of a constitutive model for numerical applications (*one Ph.D student*)
- Rio Tinto Center for Underground Mine Construction, 2012 – 2013 (role: Co-I) - **Awarded sum ~ $60'000**

  Topic: Analyses of the failure behaviour and strength of veined rock types, and identification of key rock mass characteristics relevant for the performance of tunnel boring systems.
- Rio Tinto Center for Underground Mine Construction, 2012 – 2013 (role: Co-I) - **Awarded sum ~ $50'000**

  Topic: Laboratory Investigation on veined rocks utilizing state of the art testing devices, CT-scans and microstructural analyses
- Federal Department of Defense, Civil Protection and Sports, 2012 – 2014 (role: PI) - **Awarded sum ~ $35'000**

  Topic: Hydro-mechanical modeling of a mine-by project at the Mont Terri Underground research Laboratory to better understand micro-acoustic signals, pore pressure signals and fracture development
- Federal Road Office Switzerland, 2011 – 2013 (role: PI) - **Awarded sum ~ $145'000**

  Topic: Brittle fracturing of sulfate bearing clay rocks and its influence on ground water flow and swelling (*one Post-Doc for 1 year*)

- Laboratory Equipment Grant, Office of Research, ETH Zürich, 2010 (role: PI) - **Awarded sum ~ $45'000**

  Equipment: Servo-hydraulic computer-controlled rock compression testing machine

- Kanton Glarus, Department of Forest and Natural Hazards, 2008 – 2012 (role: PI) - **Awarded sum ~ $90'000**

  Topic: Detailed investigations of rock slope instabilities in potential permafrost areas (*2 M.Sc. student and 2 B.Sc. students*)

- Swiss Nuclear Safety Inspectorate, 2008 – 2013 (role: PI) – **Awarded sum ~ $650'000**

  Topic: Mine-by experiment at the Mont Terri Underground Research Laboratory with special focus on the influence of multi-scale pre-existing discontinuities on rock mass behaviour (*one Ph.D student and 4 M.Sc students*)

Professional Services

Editorial responsibilities

- Rock Mechanics and Rock Engineering
- Landslides
- Earth Surface Processes and Landforms
- Géotechnique Letters
- Acta Geotechnica
- Environmental Earth Science
- Geotechnical and Geological Engineering

Independent expertise

- Review board of the Swiss Nuclear Safety Inspectorate for reports on site selection, rock mechanics and constructability of a disposal for high- and low level nuclear waste. Independent expertise for potential radioactive waste disposals sites.
- Independent expert team to analyze the collapse of the tunnel Wolfacher Nord, Switzerland

Professional Affiliation

- International Society of Rock Mechanics (ISRM)
- Swiss National Society of Geotechnics
- German National Society of Geotechnics
- Member of the ISRM Commission on "Spall Prediction"
- American Rock Mechanics Association

Invited Presentations

- "Brittle failure mechanism in clay shale", *Meeting of the ISRM commission on spalling*, San Francisco, 2013
- "Insight to rock slope instabilities in the Glarner Mountains, Switzerland – the role of permafrost on slope stability and deformation mechanism", *Meeting of the National Emergency Center Glarus*, Galrus, Switzerland, 2012
- "The role of suction on the strength and behavior of Opalinus Clay", *Annual progress meeting of the Cyclic Deformation Project*, St. Ursanne, Switzerland, 2012
- "The failure behavior of veined rock under compression", *Rio Tinto Workshop on Underground Mine Construction*, Phoenix, AZ, USA, 2012
- "Fundamental questions associated with the design of a pilot facility for nuclear waste storage and long-term monitoring", *AGNEB – Swiss Federal Workshop for Nuclear Waste Disposal*, Baden, Switzerland, 2012
- "The influence of rock mass characteristics on the penetration of a tunnel boring system – new findings due to improved monitoring and modeling techniques" *Colloquium on mechanized excavation, Institute of Geotechnical Engineering*, ETH Zürich, Switzerland, 2012
- "Rock mechanical considerations related to the construction of a nuclear waste repository in clay rock", *Engineering Geological Seminar at the ETH Zürich*, Switzerland, 2011
- "The role of brittle failure in sedimentary rocks in Swiss underground excavation", *CEMI Lecture Series*, Sudbury, Ontario, Canada, 2010
- "Sedrun landslide – the meaning of geological assessment and monitoring for understanding the processes", *ETH Zürich Certificate of Advanced Studies*, Monte Verritas, Ticino, Switzerland, 2010
- "The brittle failure behaviour of clay rock under compression", *International technical Meeting at the Underground Research Laboratory Mont Terri*, St. Ursanne, Switzerland, 2007, 2008
- "Some engineering geological and rock mechanical aspects associated with the construction of a high level nuclear waste repository", *Annual Conference of the Swiss Society of Engineering Geology*, Bern, Switzerland, 2010
- "Subsidence due to deep tunnel excavations", *Engineering Geological Seminar at the ETH Zürich*, Switzerland, 2006
- "Sedrun landslide", *Engineering Geological Workshop on Landslides*, Technical University of Munich, Germany, 2006

Publications

In Review / Submitted

Amann, F., Ö. Ündül and P.K. Kaiser (in review): Strength of heterogeneous sulfate-rich clay rocks and failure behaviour near tunnels, *Rock Mech Rock Eng*

Leith, K., J.R. Moore, **F. Amann**, S. Löw (in review). Sub-glacial extensional fracture development and implications for Alpine valley evolution, *JGR*

Leith, K., J.R. Moore, **F. Amann**, S. Löw (in review). In situ stress control on the development of near-surface extensional fractures in alpine landscapes, *JGR*

Peer Reviewed Journals:

Amann, F., P.K. Kaiser, E.A. Button (2012). Experimental study of the brittle behavior of clayshale in rapid triaxial compression. *Rock Mech Rock Eng*, 45 (1), 21-33

Nussbaum, C., P. Bossart**, F. Amann**, C. Aubourg (2011). Tectonic and artificial structures in the Opalinus Clay at the Mont Terri rock laboratory, *Swiss Journal of Geoscience,* 104, 187-210

Hungr, O., **F. Amann** (2011). Limit equilibrium of asymmetric, laterally-constrained rockslides, *Int J Rock Mech Mining Sci,* 48, 748-758

Amann, F., E.A. Button, K.F. Evans, M. Blümel, V.S. Gischig (2011). Experimental study of the brittle behavior of clayshale under unconfined compression. *Rock Mech Rock Eng,* 44 (4), 415-430 210

Gischig, V., **F. Amann**, J.R. Moore, S. Loew, H. Eisenbeiss, W. Stempfhuber (2011). Composite Rock Slope Kinematics at the Current Randa Instability, Switzerland, based on Remote Sensing and Numerical Modeling, *Engineering Geology*, 118(1-2), 37-53

Gischig, V.S., J.R. Moore, K.F. Evans, **F. Amann**, and S. Loew (2011). Thermo-Mechanical Forcing of Deep Rock Slope Deformation: 1. Conceptual Study of a Simplified Slope. *JGR*, 116, F04010

Gischig, V.S., J.R. Moore, K.F. Evans, **F. Amann**, and S. Loew (2011). Thermo-Mechanical Forcing of Deep Rock Slope Deformation: 2. the Randa Rock Slope Instability. *JGR*, 116, F04010

Fischer, L**.**, **F. Amann**, J.R. Moore, and C. Huggel (2010). Assessment of periglacial slope stability for the 1988 Tschierva rock avalanche (Piz Morteratsch, Switzerland), *Engineering Geology*, 116(1-2), 32-43

Amann, F., G. Donatsch, Y. Bonanomi and M. Moser (2006). Kinematik und Bewegungsmechanismus der tiefgründigen Instabilität Cuolm Da Vi (Graubünden, Schweiz). Bull. angew. Geol., 11/2, 117-131

Refereed Conference Proceedings

Amann F., P.K. Kaiser, Ö. Ündül (2013). Brittle failure processes in veined clay rock with large strength contrast between vein and matrix. paper accepted for the *47th US Rock Mechanics / Geomechanics Symposium 2013*, San Francisco, American Rock Mechanics Association, ARMA

Perras, M., E. Ghazvinian, M. Diederichs, **F. Amann**, H. Wannenmacher (2013). Back-analyses of rock mass behaviour of Quintner limestone at the Gonzen Mine near Sargans, Switzerland. paper accepted for the *47th US Rock Mechanics / Geomechanics Symposium 2013*, San Francisco, American Rock Mechanics Association, ARMA

Amann F., R. Thöny, C.D. Martin (2012). Rock mechanical considerations associated with the construction of a nuclear waste repository in clay rock, paper presented at the *46th US Rock Mechanics / Geomechanics Symposium 2012*, Chicago, American Rock Mechanics Association, ARMA

Perras, M., G. Walton, M. Diederichs, **F. Amann** (2012). Fracture initiation and propagation in carbonates, paper presented at the *46th US Rock Mechanics / Geomechanics Symposium 2012*, Chicago, American Rock Mechanics Association, ARMA

Wannenmacher, H., M. Bauert, **F. Amann** (2012). Design aspects for concrete lined vertical shafts for hydropower construction, paper presented at *European Rock Mechanics Symposium 2012*, Stockholm, Sweden, Rock Engineering and Technology for Sustainable Underground Construction.

Moore, J.R., V. Gischig, J. Burjanek, **F. Amann**, and M. Hunziker (2012). Earthquake-Triggered Rock Slope Failures: Damage and Site Effects, *11th International & 2nd North American Symposium on Landslides*, Banff, BC, Canada.

Amann F., R. Thöny, E.A. Button, P.K. Kaiser (2011). Insight into the brittle failure behavior of clay shales in unconfined and confined compression, paper presented at the *45th US Rock Mechanics / Geomechanics Symposium 2011*, San Francisco, American Rock Mechanics Association, ARMA

Leith, K., **F. Amann**, J.R. Moore, A. Kos, and S. Loew (2010). Conceptual Modelling of Near-Surface Extensional Fracture in the Matter and Saas Valleys, Switzerland., Proceedings, *International Association for Engineering Geology Congress*, Auckland, NZ.

Amann F., P.K. Kaiser, W. Steiner (2010). Triggering swelling potential of anhydrite clay rocks by brittle failure processes, paper presented at *European Rock Mechanics Symposium 2010*, Lausanne, Switzerland, Rock Mechanics and Environmental Engineering, edited by Zhao, Labious, Dudt and Mathier, Taylor & Francis Group, London

Amann F., E.A. Button, M. Blümel, R. Thöny (2010). Insight into the mechanical behaviour of Opalinus Clay, paper presented at *European Rock Mechanics Symposium 2010*, Lausanne, Switzerland, Rock Mechanics and Environmental Engineering, edited by Zhao, Labious, Dudt and Mathier, Taylor & Francis Group, London

Kaiser P.K., **F. Amann**, W. Steiner (2010). How highly stressed brittle rock failure impacts tunnel design, paper presented at *European Rock Mechanics Symposium 2010*, Lausanne, Switzerland, Rock Mechanics and Environmental Engineering, edited by Zhao, Labious, Dudt and Mathier, Taylor & Francis Group, London

Thoeny R., **F. Amann**, E.A. Button (2010). Ground conditions and the relationship to ground behavior - a new mine-by project in Opalinus clay at Mont Terri Rock Laboratory, paper presented at *European Rock Mechanics Symposium 2010*, Lausanne, Switzerland, Rock Mechanics and Environmental Engineering, edited by Zhao, Labious, Dudt and Mathier, Taylor & Francis Group, London

Wannenmacher, H., F. Grünenfelder, **F. Amann**, E.A. Button (2010). Construction of shallow caverns in blocky ground, paper presented *at European Rock Mechanics Symposium 2010*, Lausanne, Switzerland, Rock Mechanics and Environmental Engineering, edited by Zhao, Labious, Dudt and Mathier, Taylor & Francis Group, London

Amann, F., Moser, M. (2006). Entwicklung eines geomechanischen Modells der Grosshangbewegung Cuolm Da Vi - Geomechanische Hypothese und deren Verifikation (Development of a geomechanical model for the Sedrun landslide – Geomechanical Hypothesis and Verification). *Geomechanikkolloquium Freiberg, Germany*.

Amann, F., Hessler, N., Fellner, D. (2006). Städtischer Tunnelbau – Grosse Ausbruchquerschnitte im Lockergestein bei geringer Überlagerung (Urban Tunnelling – Large excavation diameters in soil at shallow overburden). *Bauen in Boden und Fels, Technische Akademie Esslingen*.

Amann, F., Fellner, D. (2005). Modelling yielding support by programming FLAC 2D/3D, paper presented at *Long Tunnel Symposium 2005*, Taipe, China

Amann, F., Bonanomi, Y., Moser, M. (2005). Geomechanics of the unstable rock slope Cuolm Da Vi (Grison, Switzerland) as a decision aid for risk assessment, paper presented at *15. Tagung für Ingenieurgeologie 2005*, Erlangen Germany

Fellner, D., **F. Amann** (2005). Geotechnical prognosis and designing in hazard scenarios, paper presented at *15. Tagung für Ingenieurgeologie 2005*, Erlangen Germany

Fellner, D., **F. Amann** (2004). Modeling yielding support by programming FLAC 2D/3D, paper presented at *10. ISRM Symposium (Eurock) 2004*, Salzburg, Austria

Public Reports

Thoeny, R, **Amann F.**, S. Löw (2012). RC-Experiment, Rock Mass Characterisation. *ENSI Erfahrungs- und Forschungsbericht 2012*

Amann F., S. Löw (2011). Stellungnahme zur Abklärung ergänzender geologischer Untersuchungen der Nagra zur Standsicherheit und Erschliessung der Lagerkammern, Expertenbericht im Hinblick auf Etappe 2 des Sachplans geologische Tiefenlager, *Swiss Federal Nuclear Safety Inspectorate*

Thoeny, R, **Amann F.**, E.A. Button, S. Löw (2011). RC-Experiment, Rock Mass Characterisation. *ENSI Erfahrungs- und Forschungsbericht 2011*

Amann F., E.A. Button, R. Thoeny, S. Löw (2010). RC-Experiment, Rock Mass Characterisation. *ENSI Erfahrungs- und Forschungsbericht 2010*

Amann F., S. Löw (2009).Vorschlag geologischer Standortgebiete für das SMA- und das HAA-Lager: Beurteilung und Anwendung der bautechnischen Auswahlkriterien, Expertenbericht im Rahmen der Beurteilung des Vorschlags geologische Standortgebiete für das SMA- und das HAA-Lager, Etappe 1, Sachplan geologische Tiefenlager, *Swiss Federal Nuclear Safety Inspectorate*

Amann F., E.A. Button, R. Thoeny, S. Löw (2009). RC-Experiment, Rock Mass Characterisation. *ENSI Erfahrungs- und Forschungsbericht 2009*

Amann F., S. Löw, E.A. Button, R. Thoeny, (2008). RC-Experiment, Rock Mass Characterisation. *HSK Erfahrungs- und Forschungsbericht 2008*

Conference Abstracts

Amann, F., A. Kos, O. Lanfranchi (2012). The influence of temperature drop on the displacement of a deep-seated rock instability in a permafrost environment in Switzerland, AGU 2012, San Francisco

Leith, K., J.R Moore, **F. Amann**, A. Kos, S. Loew (2010). Slope Failure Induced by Post-Glacial Extensional Fracturing in the Matter and Saas Valleys, Switzerland, Geophysical Research Abstracts, 12, EGU2010-4599-1

Fischer, L., C. Huggel, A. Kääb, R.S. Purves, J. Nötzli, H. Eisenbeiss, **F. Amann**, J.R. Moore, and W. Haeberli (2010). On the Influence of Topographic, Geological and Cryospheric Factors on Slope Instabilities in Steep Periglacial Rock Walls, Glacier Hazards, Permafrost Hazards and GLOFs in Mountain Areas Workshop, Vienna

Rothard, G., E. Button, **F. Amann**, A. Kos (2010). Internal and external factors affecting the stability of the Kärpf rock slope, Canton Glarus, Switzerland. European Geophisical Union, Vienna, Austria 2010. Geophysical Research Abstracts, 12, EGU2010-15220

Kos A., **F. Amann**, T. Strozzi, W. Tomkinson, D. Conforti, A. Wiesmann (2010). Application of a portable radar interferometer and terrestrial long-range lidar for high resolution data acquisition of natural rock slopes. Geophysical Research Abstracts, Vol. 12, EGU2010-15040

Kos A., **F. Amann**, T. Strozzi, E. Button, G. Rothard (2010). Preliminary results of short-term continuous monitoring of an unstable permafrost affected rock slope using a portable, real aperture radar interferometer (GPRI). Geophysical Research Abstracts, Vol. 12, EGU2010-8074

Monographs

Amann, F.A. (2006): Grosshangbewegung Cuol Da Vi (Graubünden, Schweiz) – Geologische-geotechnische Befunde und numerische Untersuchungen zur Klärung des Phänomens (Sedrun Landslide - Geological and geotechnical findings and numerical investigations for a better understanding of the phenomenon), *Friedrich-Alexander Universität Erlangen-Nürnberg*, Engineering Geology, Ph.D thesis

Amann, F.A. (2002): Schwermetalltiefenverteilung und Bindungsformen in Böden unterschiedlicher Nutzung (Depth distribution and species of heavy metals in soils under different land use), *Friedrich-Alexander Universität Erlangen-Nürnberg*, Applied Geology, M.Sc thesis